

CHUDACEK, S.

Cooperation of geophysics and geology in ore prospecting.

P. 239 (Rudy) Vol. 5, no. 7, July 1957, Praha, Czechoslovakia

SO: Monthly Index of East European Accessions (EEAI) Vol. 6, No. 11 November 1957

CHUDACEK, Z.; SPINKA, J.

Comparative results in intravenous cholangiography with biligrafin & in peroperative cholangiography. Cesk. rentg. 12 no.3:176-178 Sept 58.

1. Ustredni rtg oddeleni Statni fakultni nemocnice v Plzni, prednosta prim. MUDr. A. Cipera II. chirurgicka klinika fakulty vesob. lekarstvi v Plzni, prednosta doc. dr. J. Spinka. Z. Ch., Plzen, Marxova 13.

(CHOLANGIOGRAPHY

contrast medium, sodium iodipamide in intravenous & peroperative cholangiography comparison (Cz))

(IODIPAMIDE

sodium iodipamide in intravenous & peroperative cholangiography, comparison (Cz))

CHUDACEK, Zdenek (Plzen, Dobrovskeho 11.)

Experiences with intravenous cholangiography with biligraffin. Cas.
lek. cesk. 97 no.29:897-902 11 July 58.

1. Ustredni rtg oddeleni fakultni nemocnice v Plzni, prednosta prim.
Dr. A. Ciperka.

(CHOLANGIOGRAPHY,

intravenous, with biligraffin (Cs))

CHUDACEK, Z.; IAHN, V.

Blood protein level and excretion of biligrafin. Cesk. rentg. 13 no.3:
192-198 June 59.

1. Ustredni rtg oddeleni, primar MUDr. A. Cipera, a ustredni laboratore,
urednosta prof. MUDr. K. Bobek, stat. fakultni nemocnice v Plzni. M.S.
Praha 1, Mala Strana, U Zelezne lavky 6/557. Zd. Chudacek, ustr. rtg odd.
KUNZ, Marxova 13, Plzen.

(CHOLECYSTOGRAPHY

eff. of dysproteinemia on biligrafin excretion (Cz))

(BLOOD PROTEINS

dysproteinemia, eff. on biligrafin excretion in cholecysto-
graphy (Cz))

CHUDACEK, Zdenek; SPINKA, Josef

Sources of difficulties in evaluation of peroperative cholangiograms.
Cesk.rentg. 14 no.5:314-320 0 '60.

1. Ustredni rtg oddeleni SFW v Plzni, prednosta doc. dr. Frant.
Holik II. chirurgicka klinika lek. fak. v Plzni, prednosta doc.
dr. Josef Spinak.
(CHOLANGIOGRAPHY)

VALENTA, Jiri; CHUDACEK, Zdenek

Conditions of the deep venous system and lymphatic vessels in leg
ulcers. Acta univ. carol. [Med] Suppl. 15:109-112 '61.

1. II. chirurgická klinika lékařské fakulty University Karlovy se sídlem
v Plzni, přednosta doc. dr. J. Spinka.

(VARICOSE ULCER radiog) (ANGIOGRAPHY)
(LYMPHATIC SYSTEM radiog)

ANDEL, Z.; VALENTA, J.; CHUDACEK, Z.

Phlebographic and functional findings following Moskowicz operation for varicose veins. Acta univ. carol. [Med] Suppl. 15:121-129 '61.

1. II. chirurgická klinika lékařské fakulty University Karlovy se sídlem v Plzni, přednosta doc. dr. J. Spinka.
(VARICOSE VEINS surg) (ANGIOGRAPHY)

PETERA, V.; CHUDACEK, Z.; LAHN, V.; technicka spoluprace VELISKOVA, L.

Effect of methyltestosterone on the secretion of biligradin into
the biliary tract. Cesk. gastroent. vyz. 15 no.4:247-249 J^u '61.

1. Klinika chorob vnitrnich v Pizni, prednosta prof. dr. K.Bobek
Centralni rtg oddeleni KUNZ v Pizni.
(CONTRAST MEDIA metab) (TESTERONE rel cpds)
(CHOLANGIOGRAPHY)

CHUDACEK, Z.

On the interpretation of failure in intravenous biligradin cholangiography. Cas.lek.cesk 100 no.37:1167-1169 15 S '61.

1. II chirurgická klinika v Plzni, přednosta doc. dr. J. Spinka.

(CHOLANGIOGRAPHY compl)

CHUDACEK, Z.

Our experience with biligrafin cholangiocholecystography in acute abdominal conditions. Cesk. gastroent. 16 no.1:61-64 Ja '62.

1. Ustredni rtg oddeleni Statni fakultni nemocnice v Plzni,
zastupujici vedouci MUDr. Z. Chudacek.

(CHOLECYSTOGRAPHY)
(IODIPAMIDE)

(CHOLANGIOGRAPHY)
(ABDOMEN ACUTE)

CHUDACEK, Z.

Flexible reinforcing foils of the Czechoslovakian production. Cesk.
rentgenol. 16 no.2:140-141 Ap '62.

1. Ustredni rig-oddeleni SFN v Plzni, zastupajici vedouci lekar dr.
Z. Chudacek.

(RADIOGRAPHY equip & supply)

CHUDACEK, Zdenek; SPINKA, Josef; SEBOR, Jindrich

On the problem of possible hazards in splenoportography. Cesk.
rentgenol. 16 no.3:160-164 Je '62.

1. Rentgenove oddeleni Ustredni vojenske nemocnice v Praze, predn.
dr. F. Sykora.
(ANGIOGRAPHY compl)

VALENTA, J.; CHUDACEK, Z.

Contribution to the technic of lymphography. Rozhl. chir. 41 no.10:
710-711 0 '62.

1. II. chirurgická klinika lek. fak. KU v Plzni, prednosta doc. dr.
J. Spinka.

(LYMPHATIC SYSTEM)

(DYES)

CHUDACEK, Z. LAHN, V.; Technicka spoluprace: VELISKOVA, L.

Dehydrochol and biligraphy. Cesk. rentgen. 17 no.4:261-263
Jl '63.

1. Ustredni rentgenove oddeleni Statni fakultni nemocnice v
Plzni, vedouci MUDr. Z. Chudacek, CSc. Ustredni biochemicka
laborator Statni fakultni nemocnice v Plzni, vedouci MUDr.
et RNDr. V. Lahn.

(CHOLANGIOGRAPHY) (CHOLECYSTOGRAPHY)
(BILE ACIDS AND SALTS)

CHUDACEK, Z.

Angiographic picture of parapelvic lipoma. Cesk. rentgen. 17
no.6:374-376 N. '63.

1. Ustredni rentgenologicke oddeleni Statni fakultni nemocnice
v. Plani vedouci MUDr. Z. Chudacek.

(KIDNEY NEOPLASMS) (LIPOMA)
(NEOPLASM DIAGNOSIS) (ANGIOGRAPHY)
(RENAL VEINS)

CHUDACEK, Z.; SEBOR, J.

Our experiences with splenoportography in the diagnosis of epigastric tumors and evaluation of their operability. Cesk. rentgen. 18 no.4:243-247 J1'64

1. Ustredni rentgenol. odd. fakultni nemocnice v Plzni (vedouci: doc.dr. Z.Chudacek, CSc.) a I. chirurgicka klinika lebarske fakulty KU [Karlovy university] v Plzni (prednosta: doc. dr. J.Spinka).

CHUDACEK, Zdenek

Our experiences with simple mastography. Plzen. lek. sborn. 23:
77-80 '64

1. Ustredni RTG oddeleni Statni fakultni nemocnice v Plzni
(prednosta: doc. MUDr. Z.Chudacek, CSc.).

CHUDACEK, Z.

Reflux wirsungography. Cesk. radiol. 19 no.2:104-108 Mr '65.

1. Ustredni rentgenologicke oddeleni fakultni nemocnice v Plzni
(vedouci: doc. dr. Z. Chudacek, CSc.).

CHUDACEK, Z., doc. dr.; BILDER, J.; NOVAK, V.; VALENTA, J.

Lymphography in practice. Cesk. radiol. 19 no.2:112-115 Mr '65.

1. Ustredni rentgenologicke oddeleni fakultni nemocnice v Plzni (vedouci: doc. dr. Z. Chudacek, CSc.) a I. chirurgicka klinika lekarske fakulty Karlovy University w Plzni (prednosta: doc. dr. J. Spinka).

CHUDACEK, Z.; SEBOR, J.

Cholestasis and splenoportography. Cesk. radiol. 19 no.4/5:
323-325 Ag '65.

1. Ustredni rentgenologicke oddeleni fakultni nemocnice v Plzni,
CSSR a I. chirurgicka klinika lekarske fakulty Karlovy University
v Plzni, CSSR.

CHUDAKOV, A.

p2

PHASE I BOOK EXPLOITATION

SOV/4890

Pravda

Besprimernyy nauchnyy podvig; materialy gazety "Pravda" o trekh sovetskikh kosmicheskikh raketakh (Unparalleled Scientific Achievement: Materials From "Pravda" on 3 Soviet Cosmic Rockets) Moscow, Gos. izd-vo fiziko-matematicheskoy lit-ry, 1959. 202 p. 50,000 copies printed.

PURPOSE: This book is intended for the general reader.

COVERAGE: The book contains articles from "Pravda", announcing the launching of three Soviet cosmic rockets on 2 January, 12 September, and 4 October 1959. Articles which describe details and observations of the flights of the rockets are included and are illustrated by diagrams and photographs. The book contains non-technical contributions by several Soviet scientists. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

FIRST SOVIET COSMIC ROCKET

TASS Communiqué. On the Launching of a Cosmic Rocket Toward the Moon

5

1/4

Unparalleled Scientific (Cont.)

SOV/4890

| | |
|--|----|
| On the Flight of the Cosmic Rocket Toward the Moon. TASS Communique | 11 |
| To the Scientists, Engineers, Technicians, Workmen, and the Entire Group of Workers Participating in the Creating and Launching of the Cosmic Rocket | 19 |
| The Soviet Cosmic Rocket | 20 |
| Shklovskiy, I. S. [Doctor of Physics and Mathematics]. Artificial Comet | 49 |
| Vernov, S., [Corresponding Member, AS USSR], and A. Chudakov [Doctor of Physics and Mathematics]. The Newest in the Study of Cosmic Rays | 57 |
| The Universe Reveals Its Mysteries. Investigation of Outer Space With Rockets and Satellites | 62 |

Card 2/4

Unparalleled Scientific (Cont.)

SOV/4890

Scientists Speak

91

SECOND SOVIET COSMIC ROCKET

TASS Communiqué. On the Launching by the Soviet Union of a Cosmic Rocket
Toward the Moon

105

Motion of the Second Soviet Cosmic Rocket. TASS Communiqué

108

TASS Communiqué

115

To the Scientists, Designers, Engineers, Technicians, Workmen, and
the Entire Group Participating in the Creation and Launching of the
Second Soviet Cosmic Rocket Toward the Moon

117

TASS Communiqué. On the First Results of the Launching of the Cosmic
Rocket to the Moon

118

Card 3/4

Unparalleled Scientific (Cont.)

SOV/4890

First Flight to the Moon

121

Cordial Thanks

131

Scientists Speak

133

THIRD SOVIET COSMIC ROCKET

TASS Communique. On the Launching of the Third Cosmic Rocket by the Soviet Union

141

Third Soviet Cosmic Rocket in Flight. TASS Communique

144

An Unparalleled Scientific Achievement

158

The Third Soviet Cosmic Rocket

163

Scientists Speak

193

AVAILABLE: Library of Congress (TL796.5.R8P66)

Card 4/4

AC/ark/fal
3-20-61

CHUDAKOV, A.

Trade unions organize public control of commercial enterprises.
Sov.torg. no.2:7-9 7 '59. (MIRA 12:2)
(Retail trade)

IVANOV, G. (Moskva); CHUDAKOV, A. (Moskva)

Index of cost reduction. Sots.trud 7 no.7:66-67 J1 '62.
(MIRA 15:8)

(Costs, Industrial) (Bonus system)

BELYAYEV, V.S.; BORISENKO, L.D.; BORISENKO, E.V.; KORABLEV, A.A.;
KOLYSHKIN, O.M.; KUTLUNIN, V.A.; MALYAGIN, M.S.; SOKOLOV, A.I.;
CHUDAKOV, A.I.; ABRAMOV, V.I., otv.red.izd-va; BOLDYREVA, Z.A.,
tekhn.red.

[Manual for the coal mine mechanic] Spravochnik mekhanika
ugol'noi shakhty. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po
gornomu delu, 1960. 612 p. (MIRA 13:12)
(Coal mining machinery)

CHUDAKOV, A.

Regulating wages of employees in grain product enterprises. Sots.
trud 5 no.8:46-52 Ag '60. (MIRA 13:11)
(Grain trade) (Wages)

OSIPOV, I.; CHUDAKOV, A.

For communist labor in commerce. Sov. torg. 34 no.11:17-20 N '60.
(MIRA 13:11)

(Retail trade)

(Socialist competition)

ACCESSION NR: AP4033366

S/0103/64/025/003/0428/0430

AUTHOR: Chudakov, A. D. (Moscow)

TITLE: Algorithm for comparing two binary numbers

SOURCE: Avtomatika i telemekhanika, v. 25, no. 3, 1964, 428-430

TOPIC TAGS: binary number, binary number comparison algorithm

ABSTRACT: The known special digital-comparison schemes (by R. Brooks, I & CS, May60, and by M. J. Boswell, I & CS, Jan61) use a serial algorithm. This article proposes a parallel (higher-speed) algorithm and these logical relations:

$$y_j^{(i)} = (y_{j-1}^{(i)} \& x_{j-1}^{(i)}) \vee \{(\overline{y_{j-1}^{(i)}} \vee x_{j-1}^{(i)}) \& y_{j-1}^{(i-1)}\}$$

$$x_j^{(i)} = (x_{j-1}^{(i)} \& y_{j-1}^{(i)}) \vee \{(\overline{x_{j-1}^{(i)}} \vee y_{j-1}^{(i)}) \& x_{j-1}^{(i-1)}\}$$

for modulus comparison of two n-digit binary numbers, where $n = 2^k$. The

Card 1/2

ACCESSION NR: AP4033366

orders are compared in parallel, and the comparison results are sent to a common output through a pyramid-type scheme. Orig. art. has: 1 figure and 6 formulas.

ASSOCIATION: none

SUBMITTED: 19Apr63

DATE ACQ: 15May64

ENCL: 00

SUB CODE: MA, DP

NO REF SOV: 000

OTHER: 002

Card 2/2

L 31523-66 EWT(d)/T/EWP(1) IJP(c) BB/GG
ACC NR: AP6007862 SOURCE CODE: UR/0103/66/000/002/0066/0069

AUTHOR: Chudakov, A. D. (Moscow)

ORG: none

TITLE: The construction of adding and subtracting units, operating in an unweighted Grey code, from weighted module cells

SOURCE: ^{16C} Avtomatika i telemekhanika, no. 2, 1966, 66-69

TOPIC TAGS: error correcting code, cyclic coding, computer coding, computer component

ABSTRACT: The application of cyclic ¹⁶codes for the digital representation of analog quantities with subsequent conversion into the binary code does not eliminate the dynamic conversion error. This error is particularly appreciable in the construction of code converters of slow-action cells, or in the coding of extremely fast-response processes. In order to eliminate such errors, the present author proposes the construction of digital systems which process input data in the Grey code. The author develops the structure of

Card 1/2

UDC: 681.142.621

L 31523-66
ACC NR: AP6007862

single-cycle, one-type base addition and subtraction units in the Grey code, and deduces expressions of the eigenfunctions of these cells. Orig. art. has: 2 figures and 6 formulas.

SUB CODE: 09 / SUBM DATE: 12Mar65 / OTH REF: 001

Card 2/2 *LC*

L 43707-66 EWT(d)/EWP(1) IJP(c) BB/GG

ACC NR: AP6023671

SOURCE CODE: UR/0103/86/000/004/0155/0161

AUTHOR: Pochtar', Yu. S. (Moscow); Chudakov, A. D. (Moscow)

44
B

ORG: none

TITLE: System for the static testing of a combinative ¹⁶unit for comparing two quantities given in binary form

SOURCE: Avtomatika i telemekhanika, no. 4, 1966, 155-161

TOPIC TAGS: digital computer, computer component, binary code, algorithm, binary logic, binary number

ABSTRACT: The authors discuss a unit for the comparison of two binary-represented quantities; the unit is the fundamental component of various digital control and adjustment systems. A system of tests has been devised and is considered in this article for an n-place combinative comparison unit which realizes a special algorithm described elsewhere (A. D. Chudakov. Ob algoritme svravneniya dvukh dvoichnykh chisel. Avtomatika i telemekhanika, vol. XXV, No. 3, 1964). Using this test system, from a total of 2^{2n} possible input combinations a minimal number is selected which will ensure verification of all the possible conditions of the elementary logical operations performed by the combinative comparison unit during the comparison

Card 1/2

UDC: 681.142.82

L 43707-66

ACC NR: AP6023671

of two binary numbers. Individual unit cell operation is analyzed and an intermediate state table for the logical operations performed is tabulated. The comparison unit considered is constructed of pyramidally arranged comparison cells and consists of a pyramid of three cells, two of which are located at the base and one at the apex of the structure. Such a unit, known as a "second-order pyramid" because of the number of "tiers" in the arrangement, has a total number of possible input combinations of $N = 2^{2.4} = 256$. Other modifications of this basic type are also considered and state charts are compiled. Orig. art. has: 2 figures and 3 tables.

SUB CODE: 09,12/ SUBM DATE: 31May65/ ORIG REF: 001

Card 2/2 *LJM*

L 08219-67

ACC NR: AP6030331

SOURCE CODE: UR/0170/66/011/002/0161/0165

AUTHOR: Slobodyannikov, S. S.; Chudakov, A. D.; Pelipenko, V. I.

50
B

ORG: Moscow Technological Institute (Tekhnologicheskii institut g. Moskva)

TITLE: Electric simulation of reciprocally moving fields

SOURCE: Inzhenerno-fizicheskii zhurnal, v. 11, no. 2, 1966, 161-165

TOPIC TAGS: simulation, temperature simulation, electric analog, field theory ,
TEMPERATURE DISTRIBUTION, MECHANICAL ENGINEERING

ABSTRACT: An electrical analog computer developed by the Moscow Technological Institute for simulating problems of field theory involving reciprocal movements of field elements is described. The problem of determining the thermal distribution in the brake system of a hoisting rig is considered and solved by using the analog computer described here. A schematic drawing of the network analog computer and an oscillogram of the temperature variations in a brake drum in terms of the turning angle of the drum are given. Orig. art. has: 3 figures and 2 formulas. [AB]

SUB CODE: 09, 18/; SUBM DATE: 12Mar66/; ORIG REF: 005/; OTH REF: 002

Card

1/1

eq/k

UDC: 536.2

CHUDAKOV, Arkadiy Il'ich; FOMENKO, I.P., red.

[Local trade-union committee of a commercial enterprise]
Mestkom profsoiuza trgovogo predpriatiia. Moskva, Prof-
izdat, 1965. 77 p. (MIRA 18:10)

CHUDAKOV, A.

Wages for workers in the enterprises and organizations of the grain
trade system. Sots. trud 8 no.9:139-142 S '63. (MIRA 16:10)

CHUDAKOV, A. Ye.

USSR/Mathematics-Statistics
Nuclear Physics-Proportional Counters

Jun 49

"Statistics of Errors in Operations With Counting Devices," I.Ya. Barit,
M. I. Podgoretskiy, A. Ye. Chudakov, Phys Inst imeni P. N. Lebedev, Acad
Sci USSR, 8pp

"Zhur Tekh Fiz" Vol XIX, No 6

Derives formula to calculate errors in operations with counting devices (Geiger
counter) for various assumptions relative to the "dead" time of the registering
unit. Gives corresponding curves. Submitted 18 Jun 48

PA 46/49T51

CHUDAKOV, A. E.

V 2761
A STUDY OF NUCLEON INTERACTION WITH LIGHT
NUCLEI AT THE ENERGY RANGE OF $10^4 - 10^{11}$ ev. S. N.
Vernov, N. L. Grigorov, G. F. Zatsopin, and A. E.

Chudakov, (Lebedev Inst. of Physics). Izvest. Akad. Nauk
S.S.S.R. Ser. Fiz. 19, 493-501 (1955) Sept.-Oct. (in
Russian)

Studies of various components of cosmic rays at different stratosphere levels revealed the basic characteristics of interaction processes of nucleons with light nuclei at various energies. Diagrams and tabulations are presented. 12 references. (R.V.J.)

PH NU

IRM

③

PH

PH

CHUDAKOV, A.Ye.

On an ionisation effect linked to an observation on electron-positron
pairs at very high energies. Izv.AN SSSR Ser.fiz.19 no.6:651-656
N-D '55.

(MLRA 9:4)

1.Fizicheskiy institut imeni P.N.Lobedeva Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

GOL'DANSKIY, V.I.; ZHDANOV, G.B.; NESTEROVA, N.M.; CHUDAKOV, A.Ye.

Cerenkov radiation in extensive air showers. Izv. AN SSSR, Ser. fiz. 19
no. 6:747-748 N.D. 1955. (MLBA 9:4)

1. Fizicheskiy institut imeni P.N. Lebedeva Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

CHUDAKOV, A. Ye.

USSR/Nuclear Physics - Cherenkov radiation

FD-1865

Card 1/1 Pub. 146-25/25

Author : Nesterova, N. M., and Chudakov, A. Ye.

Title : Observation of Cherenkov radiation accompanying wide atmospheric cosmic-ray showers

Periodical : Zhur. eksp. i teor. fiz. 28, 384, March 1955

Abstract : Cherenkov radiation arising during the passage of fast charged particles through matter must take place not only in dense media, but also in air under condition of sufficiently great speed of the particles, the intensity of radiation of the individual particles being very small but the total effect of the atmosphere recordable against the radiation background of the night sky. The theoretical discussion of this phenomenon was given by V. I. Gol'danskiy and G. B. Zhdanov (ibid., 26, 405, 1954). Here the authors discuss preliminary attempts to investigate flashes in the night-sky radiation and to establish their connection with wide atmospheric showers, on the bases of work conducted at 3860 meters above sea level.

Institution: Physics Institute im. P. N. Lebedev, Academy of Sciences USSR

Submitted : November 30, 1954

570055/1

PHASE I BOOK EXPLORATION

RM/1911

21(1)

International Conference on Cosmic Radiation. Budapest, 1956.

Hungarian Academy of Sciences. Budapest, 1957. 167 p.

Sponsoring Agency: Magyar Tudományos Akademia

Mr. I. E. Jorgensen, and A. Jorgensen

PROJECT: This report is intended for geophysicists concerned with cosmic radiation.

The papers read at the conference, and the problems dealt with include nuclear ray measurements planned for the International Geophysical Year. Most of the reports are followed by references. Soviet scientists in the field of cosmic radiation who attended the conference are: E. I. Andronikashvili, E. A. Dobrovolskiy, E. I. Gerasimov, E. I. Kholodnyy, and E. I. Varny. The articles are written in English, German and Russian without parallel translations.

International Conference (Cont.)

RM/1911

1. Andronikashvili, E. I. The Study of Nuclear Active Components of Extensive Atmospheric Showers of Cosmic Rays 50
2. Varny, E. I. and Zaitseva, G. T. Height Dependence and the Problem of the Core of Extensive Atmospheric Showers (not incl.)
3. Gerasimov, E. I. Characteristic Radiation of Extensive Atmospheric Showers of Cosmic Rays 57
4. Andronikashvili, E. I., and E. P. Khilashvili. The Study of the Spatial Distribution of Penetrating Particles of Extensive Atmospheric Showers 63

FIELD SESSION

EXTENSIVE AIR SHOWERS

1. Bock, J. J., Jorgensen, and J. H. Marshall. The Transition Curve of the Electron-Photon Component of Extensive Air Showers in Lead Absorbers of Thicknesses Between 0 and 25 cm. 73
2. Jorgensen, J., T. Sander, and A. Jorgensen. Investigation of Extensive Air Showers 230 m. Above Sea Level 95

Card 3/6

CHUDAKOV, A. Ye.

CHUDAKOV, A Ye.

AUTHORS: Voykovskiy, B.A., Galaktionov, A.I., Tret'yakova, M.I. 120-6-8/36
and Chudakov, A.Ye.

TITLE: Photomentering of Tracks Due to Charged Particles in Photographic Emulsions (Fotometrirovaniye sledov zaryazhennykh chastits v fotoemul'sii)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, No.6,
pp. 38 - 42 (USSR).

ABSTRACT: A photometer is described which can be used to determine the density of a track in a photographic emulsion. A photograph of the apparatus is given in Fig.1 and its principles are as follows. The part of the track under investigation is made parallel to the slit of the photometer. Light which passes through the track objective and then the photometer slit is intercepted by the cathode of a photomultiplier. Depending on the density of the track the output of the photomultiplier falls or increases, as the slit is moved along and parallel to the track. The voltage across the photomultiplier load is then amplified by an amplifier and is applied to the plates of an oscilloscope. An automatic device is incorporated which ensures that the track always lies within the slit. The quantity h/H (where h is the maximum density on the axis of the track and H is the background density) was measured for protons and

Card1/3

120-6-8/36

Photomentering of Tracks Due to Charged Particles in Photographic Emulsions.

π -mesons as a function of residual range. Comparing the ranges of protons and π -mesons corresponding to the same value of h/H the ratio of the mass of the protons to that of the mesons could be calculated (for ranges between 520 and 1 100, and 3 800 - 7 000 microns for protons and π -mesons, respectively). Figs. 4 and 6 show curves of h/H as functions of range for protons, π -mesons, and τ -mesons. Using the above method, it also is possible to determine the cross-sectional profile of each track. The area under this curve is denoted by S . The following masses were found for the τ -mesons:

$$m_{\tau} = (1\ 050 \pm 175) m_e \quad (\text{from } h/H \text{ and the range})$$

$$m_{\tau} = (985 \pm 120) m_e \quad (\text{from } S \text{ and the range}).$$

The values for the π -mesons are as follows:

$$m_p/m_{\pi} = 6.4 \pm 0.6 \quad (\text{from } h/H \text{ and the range})$$

$$m_p/m_{\pi} = 6.6 \pm 0.5 \quad (\text{from } S \text{ and the range}).$$

Card2/3

It is found that using the "S method" it is easier to separate singly-charged particles of different nature. A measurement of

120-6-8/36

Photomentering of Tracks due to Charged Particles in Photographic
Emulsions.

S will also yield Z for relativistic particles. V. Karpova
and V. Sachkov carried out the measurements on the instrument.
There are 6 figures and 7 non-Slavic references.

ASSOCIATION: Institute of Physics imeni P.N. Lebedev Ac.Sc. USSR.
(Fizicheskii Institut im. P.N. Lebedeva AN SSSR)

SUBMITTED: May 21, 1957

AVAILABLE: Library of Congress.

Card 3/3

CHUDAKOV, A.YE.

53-11-10/18

AUTHOR
TITLE

VERNOV, S.N., LOGACHEV, Yu.I., CHUDAKOV, A.YE., SHAFER, Yu.G.
The Investigation of the Variations of Cosmic Radiation
(Issledovaniye variatsiy kosmicheskogo izlucheniya, Russian)
Uspekhi Fiz. Nauk, 1957, Vol 63, Nr 1b, pp 149 - 162 (U.S.S.R.)

PERIODICAL

ABSTRACT

The present paper reports on the problem of the use of an artificial satellite for the study of the variations of cosmic radiation. By means of a comparatively simple apparatus consisting of a counter and ionization chamber the following phenomena can be studied: a) the variations of the primary cosmic radiation, b) the variations of the multiply charged component of the primary cosmic radiation which consists of helium nuclei and heavier atoms, c) the geomagnetic field at great distances from the earth, d) the albedo of the earth for cosmic radiation, e) the structure of currents emitted by the sun.

I. Possibilities offered by the artificial earth satellites for the investigation of the variations. The variations of the secondary cosmic radiation differ essentially from the variations of the primary radiation. It is just for that reason that the study of the variations of the primary radiation is desirable. The variations recorded at sea level are usually much smaller than the variations of primary radiation. The measurements obtained by means of rockets are very inaccurate because of the short stay of the rockets in high altitudes, but artificial earth

Card 1/4

The Investigation of the Variations of Cosmic Radiation

satellites offer great possibilities in this respect. Simultaneous measurements by counters and ionization chambers make a comparison of the variation of intensity of the primary protons with the variation of the intensity of the heavier primary nuclei possible. The variations have to be determined in the various regions of the energy spectrum of cosmic radiation. This is only possible on satellites with suitably selected orbits. The measurements of the intensity above the polar regions are of special interest.

II. The various phenomena which can be studied by an apparatus fixed in the satellite. The authors here consider the case that the satellite flies over the poles and is half of the time in the earth's shadow. Further, the measurement data can be transmitted during the entire time of the satellite's existence. The experimental material thus obtained on one single day by far surpasses the hitherto existing material in this field. By a comparison of the material obtained from various revolutions and on various days the variations of intensity of the cosmic radiation can be concluded. If the data for the intensity and for the ionization power of cosmic radiation over the entire surface of the globe is available, interesting conclusions concerning the following phenomena may be drawn:

Card 2/4

53-1b-10/18

The Investigation of the Variations of Cosmic Radiation

- 1.) the alteration of intensity in time (great irregularities of intensity in connection with eruptions of the solar chromosphere, reduction of intensity during magnetic storms, the variation (one and a half hour variation)) connected with the revolution of the satellite round the earth, the variations of intensity of the heavy nuclei of primary cosmic radiation, the long-time periodic variations, the experimental verification of the connection between primary and secondary variations.
- 2.) the earthmagnetic field and the interplanetary magnetic field.
- 3.) the alteration of the earth's albedo for cosmic radiation. 4.) the search for electrons and photon in the primary cosmic radiation.

III. The apparatus for the study of the variations of cosmic radiation outside the earth's atmosphere can determine these variations by measuring the variations of the ionization or the variations of particles passing through a counter. The influence of a possible revolution of the satellite is pointed out, but this variation can at least partially be compensated by fixing two counters to the satellite. For the radio-technical equipment semiconductor triodes and tiratrones with a cold cathode are used. The following elements of the apparatus are discussed more in details: a) the counters of the charged particles, and b) the

Card 3/4

53-1b-10/18

The Investigation of the Variations of Cosmic Radiation
counting method by means of semiconductor triodes. (5 illustrations)

ASSOCIATION
PRESENTED BY
SUBMITTED
AVAILABLE

Not given

Library of Congress

Card 4/4.

29(0)

PHASE I BOOK EXPLOITATION

SOV/1658

Akademiya nauk SSSR

Iskusstvennyye sputniki zemli, vyp. 1: Rezul'taty nauchnykh issledovaniy, provedennykh po programme MGG pri pomoshchi pervogo i vtorogo iskusstvennykh sputnikov zemli (Artificial Earth Satellites, Nr 1: Results of Scientific Studies Carried Out in Accordance With the IGY Program by Means of the First and Second Artificial Earth Satellites) Moscow, Izd-vo AN SSSR, 1958. 95 p. 3,500 copies printed. [Microfilm and Zerox Copy]

Resp. Ed.: L.V. Kurnosova; Ed. of Publishing House: D.M. Alekseyev; Tech. Ed.: T.V. Polyakova.

PURPOSE: This collection of articles is the first in a series to be published regularly and is intended to disseminate to the scientific community data collected in investigations performed by means of artificial earth satellites.

COVERAGE: This collection includes papers covering scientific data obtained from the first and second Soviet artificial earth satellites. Among the areas reported on are measurements of cosmic radiation, atmospheric density, electron

Card 1/3

3

Artificial Earth Satellites (Cont.)

SOV/1658

concentration in the ionosphere, and biological studies of an animal occupant of a satellite. Papers on the motions and perturbations of satellite orbits and optical and Doppler methods of satellite tracking are also included. Coverage of the individual articles is given in the Table of Contents.

TABLE OF CONTENTS:

Preface [L.V. Kurnosova]

3

Vernov, S.N., N.L. Grigorov, Yu.I. Logachev, and A.Ye. Chudakov.

Measurements of Cosmic Radiation by Means of an Artificial Earth Satellite 5

This paper was first published in Doklady Akademii Nauk USSR Vol. 120, Nr. 6, 1958, pp. 1231-1233. The paper presents preliminary results of measurements of cosmic-ray intensity obtained with instruments installed in Sputnik II. The close agreement of data from two separate instruments indicates the validity of these results. A brief description of the instruments and their operational characteristics are given. Since the ascending and descending segment of the orbit occurred at considerably different altitudes, it was possible to determine the relative

Card 2/25

3

Artificial Earth Satellites (Cont.)

SOV/1658

variation of cosmic-ray intensity as a function of altitude for the same geographic points. The intensity was found to increase considerably between 225 and 700 km, the highest altitude achieved by the satellite. This variation is attributed to three causes: a) decreased screening by the earth, b) reduction in the magnetic field of the earth permitting penetration of lower-energy particles, and c) change in the albedo of cosmic radiation. There are 3 references, 1 of which is Soviet, 1 English, 1 a translation from English.

5

Lidov, M.L. Determination of the Density of the Atmosphere From the Observed Decelerations of the First Artificial Satellites

9

This paper presents equations relating the elements of a satellite orbit to atmospheric density. The analytical procedures used in reducing observed data on the evolution of the satellite orbit are given including an evaluation of the approximations used in obtaining solutions to the equations involved. It was assumed that in the range of altitudes considered (228-368 km) the variation of density with altitude could be approximated by the exponential function $\rho = \rho_{\pi} e^{-\frac{z - z_{\pi}}{H}}$

where ρ is the density at altitude z , ρ_{π} is the density at the perigee altitude z_{π} , and H is the altitude of the homogeneous

Card 3/45

3

CHUDAKOV, A., and VERNOV, S. N.,

"Cosmic Ray and Photon Measurements from Satellites," paper presented at 10th General Assembly, Int'l Astronomical Union, Moscow, Aug 1958.

VERNOV, S.N.; VAKULOV, P.V.; GORCHAKOV, Ye.V.; LOGACHEV, Yu.I.;
CHUDAKOV, A.Ye.

Studying the soft component of cosmic rays beyond the atmosphere
limit. Isk.sput.Zem. no.2:61-69 '58. (MIRA 12:5)
(Cosmic rays) (Artificial satellites)

Comment: This collection of articles contains results of the scientific find-
ings presented by the third Soviet space satellite. Each corroborating
data from other rocket and satellite investigations are included. The
articles are based on papers originally read at the Fifth Assembly of the

At the Special UN Committee held in Moscow in August, 1958. Individual
articles discuss the basic composition and density of the atmosphere, the
thermodynamic parameters of the stratosphere, and questions dealing with
the motion of the satellite. References accompany each article.

SOV/26-58-12-15/44

AUTHOR: Chudakov, A.Ye., Candidate of Physical-Mathematical Sciences
(Moscow)

TITLE: The Study of Photons by Means of the Third Artificial Satellite of the Earth (Izucheniye fotonov pri pomoshchi tret'yego iskusstvennogo sputnika zemli)

PERIODICAL: Priroda, 1958, Nr 12, pp 88-90 (USSR)

ABSTRACT: The article is based on a paper read by the author at the session of the Fifth Assembly of the Special Committee for the Mode of Performance of the IGY and deals with new important results of photon research obtained by means of the third sputnik. The data concerning photons at high altitudes were obtained by means of a luminescence counter installed in the satellite. This counter, much more effective than a geiger counter, consisted of a cylindric natrium iodide crystal of 40 x 40 mm dimension and a photomultiplier (FEU) with a photocathode of 45 mm diameter (Fig. 1). The pulses originating on the output end of the photomultiplier were amplified by a semiconductor amplifier and transmitted to a binary network also assembled from semiconductors. The scaling factor equalled 4096. At the output end of the scaling circuit, there was a relay whose position of the contacts was

Card 1/4

SOV/26-58-12-15/44

The Study of Photons by Means of the Third Artificial Satellite of the Earth

transmitted by radio. In addition to the intensity of the counting, the position of two other relays was also transmitted by radio. These relays were for the transmission of data on the ionization accumulation. For this purpose, the current was measured at the output end of the photoelectric multiplier and also the current of its seventh dynode. The "Mayak" radiotransmitter was used for the transmission and operated constantly during the time of flight of the satellite. The transmission of information by the "Mayak" was done by means of measuring the length of the signals. The second and third signals of the "Mayak" were used according to the following code: the relay measuring the anode current in the closed condition provides the length of the second signal of the "Mayak" - 50 m/sec. An analogous relay measuring the dynode current, controls the length of the third signal. The position of the relay measuring the count is transmitted by way of altering the length of the second or third signal from 150 to 100 m/sec. The transmitted signals had to be recorded by numerous receiver points. Of the mass of data, little has been evaluated. Full information from the device was obtained for a period of

Card 2/4

SOV/26-58-12-15/44

The Study of Photons by Means of the Third Artificial Satellite of the Earth

during several solar bursts of activity on 6 June 1958. A comparison of the results points to an urgently required increase of sensitivity of the recording apparatus. There are 2 diagrams, 1 set of graphs, and 1 table.

Card 4/4

SOV/26-58-12-15/44

The Study of Photons by Means of the Third Artificial Satellite of the Earth

more than one month of flight, while information on ionization currents continued over a considerably longer period of time. Evaluated data covering 20 hours of flight shows that the measuring results of the intensity count of X-ray radiation apparently originating from the electron bombardment of the satellite hull was highly effective. In all instances, the intensity of the count exceeds approximately 10 times or more the counting rate expected from cosmic rays. Recordings made during the flight of the satellite over the territory of the USSR, of its entering and leaving the Polar zone, are shown in Fig. 2 a and b. The analysis of many recordings of this kind permit the assumption that in the sector of increased count, only an unimportant increase in ionization takes place. The energy of the photons corresponding with the count increase is estimated at 100 kilo-electron volts. The origination of these photons can be explained by the decelerating radiation (Bremsstrahlung) that comes into being at the bombardment of the satellite hull by electrons with approximately the same energy (100 kev). Similar results were obtained at the recordings of photon intensity changes

Card 3/4

AUTHORS: Vernov, S. N., Corresponding Member, SOV/20-120-6-18/59
Academy of Sciences, USSR, Grigorov, N. L., Logachev, Yu. I.
Chudakov, A. Ye.

TITLE: Measurement of Cosmic Radiation by the Sputnik (Izmereniye kos-
micheskogo izlucheniya na iskusstvennom sputnike zemli)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 120, Nr 6,
pp. 1231 - 1233 (USSR)

ABSTRACT: The results discussed in this paper were obtained by
equipment incorporated in the second earth satellite. In
order to be able to record the variations of the intensity of
the cosmic radiation in a reliable manner two similar counters
for charged particles (with a length of 100 mm and a diameter
of 18 mm) was mounted in the sputnik. Both devices contained
counters operating on the basis of semi-conductor triodes. The
power consumption of the whole apparatus was 0,15 Watts. The
batteries permitted continuous operation for 200 hours. The
relative increase of the intensity with altitude was com-
puted from the ratio of the intensity of cosmic radiation on the
"inverse loops" (passage from the North to the South, at an
altitude of 350 - 700 km) and the intensity on the "direct loops"

Card 1/3

Measurement of Cosmic Radiation by the Sputnik

SOV/20-120-6-18/59

(passage from the South to the North at an altitude of 225 - 240 km) measured at the same geographical points. This variation can be caused by at least three effects: 1) An increase of intensity due to a reduction of the shielding by the earth. 2) A reduction of the intensity by the weakening of the earth's magnetic field 3) By a variation in the albedo of the cosmic radiation. The dependence of the intensity upon the altitude can be explained by the first two effects. From the data obtained by the measurements of many loops the lines of equal intensity of cosmic radiation (isocosmic lines) are obtained. Such isocosmic lines are presented for three different counting rates. The experimental points above all fit upon the geographical parallels. The line of the minimum intensity of cosmic radiation (the "cosmic equator") does not coincide with the geomagnetic equator. According to the evidence obtained the intensity of the cosmic radiation sometimes increased considerably. During this the intensity fluctuated very much. There are 4 figures and 3 references, 1 of which is Soviet.

SUBMITTED: May 4, 1958
Card 2/3

Measurement of Cosmic Radiation by the Sputnik

SOV/20-120-6-18/59

1. Cosmic rays--Measurement 2. Satellite vehicles--Applications 3. Satellite
vehicles--Equipment 4. Radiation--Counting methods

Card 3/3

CHUDAKOV, A. E.

THE SPECTRUM OF EXTENSIVE AIR SHOWERS ACCORDING TO THE NUMBER OF PARTICLES: THE
COEFFICIENT OF ABSORPTION OF EXTENSIVE AIR SHOWERS

1. Utilizing the method of correlated hodoscopes, which permits determining the position of the axis and the number of particles in a shower, we have obtained data on shower spectra level and at sea level.
2. At 3860 m above sea level and the interval of particle-number variation in the shower from 3×10^4 to 10^7 , the spectrum is well approximated by power law $N^{-\lambda}$ where $\lambda = 1.6 \pm 0.1$. At sea level there is a greater probability that the spectrum will be irregular in the range $10^6 < N < 10^7$ (for $10^4 < N < 10^6$ $\lambda = 2.1 \pm 0.2$, and for $N < 10^4$ $\lambda = 1.5 \pm 0.2$).
3. The shower absorption coefficient obtained from a comparison of absolute number of showers with a number of particles greater than that given at mountain altitude and at sea level, amounts to $1/(160-200) \text{ g/cm}^2$.

Report presented at the International Cosmic Ray Conference, Moscow, 6-11
July 1959

31520
S/627/60/002/000/002/027
D299/D304

3.2410 (1559, 1905, 2905)

AUTHORS: Chudakov, A. Ye., Nesterova, N. M., Zatsepin, V. I., and
Turkish, Ye. I.

TITLE: Cherenkov radiation of extensive air showers in cosmic
rays

SOURCE: International Conference on Cosmic Radiation. Moscow,
1959. Trudy. v. 2, Shirokiye atmosferye livni i kas-
kadnyye protsessy, 47-55

TEXT: The results are given of measurements carried out in the
autumn of 1957 at the Pamir Mountain (3860 m). The apparatus con-
sisted of 10 light detectors and 9 hodoscope units with Geiger
counters. Two types of light detectors were used for the measure-
ments. Both types incorporated photomultipliers Б(-1 (BS-1) or ФЭУ-
24 (FEU-24). The apparatus included 6 detectors of the second type
(with mirror). A special electronic circuit permitted measuring the
magnitude of the light flares in all the detectors. After process-
ing the data, it was possible to determine for each shower: 1) The

Card 1/3

31520

S/627/60/002/000/002/027

D299/D304

Cherenkov radiation of ...

intensity of the light flux at 5 points; 2) the density of the particle flow at 9 observation points and hence the position of the shower axis and the total number of particles; 3) the direction of the shower. Various showers were analyzed, with number of particles ranging from $2 \cdot 10^4$ to $1.3 \cdot 10^7$. The dependence of the intensity of the Cherenkov light on the distance from the shower axis was obtained for showers with number of particles N ranging from $2 \cdot 10^4$ to $2 \cdot 10^7$ at intervals of 10 to 250 m. from the axis, and various angles of incidence of the showers. Assuming the relationship $E = AN$, where E is the energy spent by the shower in the atmosphere, one obtains for A approx. 10 ev. Comparing the values of the light flares from showers with different number of particles, it is possible to determine the relationship between E and N . For showers with $N = 10^5$ to $N = 1.4 \cdot 10^6$, this relationship is $E \sim N^{0.8 \pm 0.05}$. This fact has to be taken into consideration when passing from the number spectrum to the energy spectrum of primary par-

Card 2/3

Cherenkov radiation of ...

31520
S/627/60/002/000/002/027
D299/D304

ticles. Figures show that the relationship between the number of particles and the intensity of the light in the shower varies as a function of the inclination of the shower. The simultaneous measurement of the light intensity at predetermined distance from the axis, and of the total number of particles makes it possible to ascertain (in principle) the role of fluctuations in the development of showers. It was found, by comparing the fluctuations at the Pamir level and at sea level (according to measurements carried out in 1959 at Moscow State University) that the fluctuations have no significant part in explaining the altitude variation of showers. There are 9 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: W. Galbraith, J. V. Jelley. Nature, 171, no. 4347, 349, 1953. [Abstractor's note: Importance of the above investigation is stressed by K. Greisen in his article "Cosmic Ray Showers", Annual Review of Nuclear Science, v. 10, 1960, 63-108; same article also contains a critical appraisal of other results by Soviet investigators, reported in this Trudy.]

Card 3/3

CHUDAKOV, A. YE.

(2)

3.2410 (1559, 2205, 1705)

31522
S/627/60/002/000/004/027
D299/D304

AUTHORS: Kulikov, G. V., Nesterova, N. M., Nikol'skiy, S. I., So-
lov'yeva, V. I., Khristiansen, G. B., and Chudakov, A. Ye.

TITLE: Number spectrum of extensive air showers at altitudes of
200 and 3860 m above sea level

SOURCE: International Conference on Cosmic Radiation. Moscow,
1959. Trudy. v. 2. Shirokiye atmosferynye livni i kas-
kadnyye protsessy, 87-91

TEXT: Number spectra of extensive air showers were investigated in
detail at the Physics Institute of the AS USSR and at Moscow State
University. The spectra were investigated at an altitude of 3860 m
and at sea level. Those at sea level were studied over a range $N =$
 $= 4 \cdot 10^3$ to $3 \cdot 10^7$. For showers with small N (10^3 to $5 \cdot 10^4$), the sta-
tistical method was used. The apparatus incorporated hodoscoped
Geiger-Muller counters, whose disposition is shown in a figure. The
experiments yielded the number of anti-coincidences n per unit time

Card 1/4

Number spectrum of ...

31522
S/627/60/002/000/004/027
D299/D304

for counters of different σ ; (σ varied between 0.4 and $1.65 \cdot 10^{-2} \text{ m}^2$). By comparing the measurements and the calculations, the integral spectrum of the showers was obtained: $F(>N) = 2.5 \cdot 10^{-3} N^{-(1.45 \pm 0.03)}$ $\text{cm}^{-2} \text{ sec}^{-1}$, with $N = 4 \cdot 10^3$ to 10^5 . For large N , the spectrum was obtained by individual study of the showers, at sea level. For this purpose, the majority of the counters were disposed in a circle. The position of the axis and the number of particles in each shower were determined by means of the electronic computer "Strela". Thereupon the integral spectrum was found for $N = 8 \cdot 10^4$ to $8 \cdot 10^5$, viz.

$$F(>N, 0) = (1.95 \pm 0.14) \cdot 10^{-10} \left(\frac{N}{10^5} \right)^{-1.5 \pm 0.1} \text{ cm}^{-2} \text{ sec}^{-1} \text{ sterad}^{-1}$$

Both series of measurements coincide in the range $N \approx 10^5$. In order to determine the absolute number of extensive air showers in the

Card 2/4

Number spectrum of ...

31522
S/627/60/002/000/004/027
D299/D304

range $N > 10^7$, the apparatus was divided into 4 groups of counters. Further, extensive air showers were studied at an altitude of 3860 m. The apparatus was controlled by photomultipliers, recording the Cherenkov radiation. [Abstractor's note: See article on p. 47, this Trudy.]. The shower axis and the number of particles were determined by means of a simulator. Showers with $N = 2 \cdot 10^4$ to 10^7 were investigated. From the obtained results, the integral spectrum of showers with $N = 2.5 \cdot 10^4$ to $1.3 \cdot 10^7$ was constructed, viz.

$$F(>N, 0) = (4.6 \pm 1.4) \cdot 10^{-11} \left(\frac{N}{10^6} \right)^{-(1.60 \pm 0.15)} \text{ cm}^{-2} \text{ sec}^{-1} \text{ sterad}^{-1}$$

The absorption length λ of showers was also determined; for showers with $N 10^5$, $\lambda = 156 \pm 22 \text{ gm/cm}^2$. There are 4 figures and 2 Soviet-bloc references.

Card 3/4

Number spectrum of ...

31522
S/627/60/002/000/004/027
D299/D304

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute im. P. N. Lebedev AS USSR); Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific Research Institute of Nuclear Physics Moscow State University)

Card 4/4

29(2,5), 3(6)

SOV/26-59-8-20/51

AUTHOR: Chudakov, A.Ye., Candidate of Physical and Mathematical Sciences and Gorchakov, Ye.V.

TITLE: Terrestrial Corpuscular Radiation

PERIODICAL: Priroda, 1959, Nr 8, pp 86-89 (USSR)

ABSTRACT: The launching of artificial earth satellites and cosmic rockets into space has opened entirely new possibilities of space investigation. An unexpected result is the discovery of the two zones of high intensively charged particles at a distance of several ten thousand kilometers from the earth's surface (see diagram). The authors report that the newly discovered zones of high intensity undoubtedly represent sources of the charged particles that have been captured by the earth's magnetic fields. The fact of localization of these sources inside a space limited from all sides gives evidence of that. According to S.N. Vernov, this phenomenon is called terrestrial corpuscular radiation. ✓

Card 1/2

SOV/26-59-8-20/51

Terrestrial Corpuscular Radiation

The first information upon the existence of two zones were obtained from the third Soviet sputnik. Simultaneously, the instruments of the sputnik recorded a systematic increase of ionization during its flight near the equatorial zones. Graph 1 (Figure 2) demonstrates the records of readings taken from a scintillating counter on board the diesel electric ship "Ob'" in the South American region on 12 June 1958. The article also mentions the name of A.I. Lebedinskiy. There are 2 graphs and 1 diagram.

ASSOCIATION: Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR/
Moskva (Physical Institute imeni P.N. Lebedev AS USSR/Moscow);
Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova
(Moscow State University imeni M.V. Lomonosov) (Gorchakov
for both institutions).

Card 2/2

CHUDAKOV, A. V.

21(0)
AUTHORS:
Yernov, S. M., Corresponding Member, AS USSR, Grigorev, E. I., Ivanenko, I. P., Lebedinskiy, A. I., Murzin, V. S., Chudakov, A. V.

TITLE:
A Possible Mechanism of the Production of "Terrestrial Corpuscular Radiation" Under the Action of Cosmic Rays (Vozmozhnyy mekhanizm soderzhiya "sotsego korpuskulyarnogo izlucheniya" pod deystviyem kosmicheskikh luchey)

PERIODICAL:
Zhurnal teoreticheskoy fiziki, 1959, Vol. 124, No. 5, pp. 1022-1025 (USSR)

ABSTRACT:
By "terrestrial corpuscular radiation" the authors mean the flux of particles moving in the terrestrial magnetic field along closed orbits. According to the authors' opinion, the following radiation production mechanism deserves the most attention: Under the action of cosmic radiation, the earth, like any other celestial body, becomes a neutron source. The neutron traverses the magnetic field without being disturbed as uncharged particles and attains great distances from the earth. The charged particles originating from neutrons decay move in the magnetic field along the lines of force. The particle in the course of time reaches the region of high geomagnetic latitudes, where field strength increases considerably with increasing latitude. In this region the velocity vector of the particle will, as the particle approaches the earth, turn so long with respect to the vector \vec{H} , until at the latitude λ_{max} the angle between the velocity of the particle and the vector \vec{H} becomes equal to 90° . At this point the particle returns and begins to move in the reverse direction along the same magnetic line of force. If conditions are favorable, the decay products of the neutrons may perform 10^5 and more revolutions between the northern and the southern magnetic poles. Therefore, the intensity of the flux of these particles is determined by the same amount. Experimental data indicate the existence of a radiation. The present paper carries out a closer investigation in order to find out by what features the intensity of this type is determined. Calculation is followed step by step. The authors calculate the intensity of the "terrestrial corpuscular radiation" for various heights and latitudes; the results obtained by these calculations are shown by a diagram. They proceed to the following conclusions: Although the number of neutrons decaying in the earth is very small, they may cause an intensive cosmic radiation. The experimentally determined intensity is by ~ 100 times lower near the equator than calculated. According to experimental data there is no terrestrial corpuscular radiation in geomagnetic latitudes above 40° , but in the present paper $J(\lambda = 40^\circ) \rightarrow J(\lambda = 0^\circ)$ is obtained. This means an agreement by more than 10^5 times the amount. In order to reestablish agreement with the experiment, it is useful to assume an additional flux of particles from latitudes. This flux may be due to the existence of electric fields. This assumption appears to be confirmed by the data concerning the considerable increase of perturbations of the terrestrial magnetic field with increasing latitude. With increasing latitude, the interferences imposed upon energy by storms, the theory are being discredited to an ever-increasing extent. The

Card 1/4

Card 2/4

Card 3/4

REMARKS:
The present paper must apply also in the neighborhood of astrophysical objects having a magnetic field. Therefore, the investigation of this radiation in the neighborhood of planets may be a means of observing weak magnetic fields. The authors thank S. V. Mikhaleva for his advice and M. A. Glikovich for discussions. There are 2 figures and 7 Soviet references.

ASSOCIATION:

Moiseyev Gendarmetvnyy universitet im. M. V. Lomonosova (Moscow State University named M. V. Lomonosov)

DATE: November 21, 1958

24(7), 24(8)
AUTHORS:

SOV/20-125-2-16/64

Vernov, S.N., Corresponding Member, AS USSR.,
Chudakov, A.Ye., Vakulov, P.V., Logachev, Yu.I.

TITLE:

Investigation of Terrestrial Corpuscular Radiation and of
Cosmic Rays During the Flight of a Cosmic Rocket (Izucheniye
zemnogo korpuskulyarnogo izlucheniya i kosmicheskikh luchey pri
polete kosmicheskoy rakety)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 2, pp 304 - 307 (USSR)

ABSTRACT:

The rocket launched on January 2, 1959 in the direction of the
moon had apparatus for recording cosmic- and terrestrial corpuscular
radiation on board. By the latter the authors mean the fluxes of
fast charged particles in great altitudes, for which the terrestrial
magnetic field is a so-called "magnetic trap". The particles were
recorded by 2 Geiger-counters and 2 scintillation-counters. The
first apparatus, with scintillation counter, was a constructive
further-development of the device which the authors had built into
the third Soviet Sputnik. A cylindrical sodium-iodide crystal
served as a detector. The authors, above all, described the results
obtained by the preliminary evaluation of the data ascertained in
altitudes of from 8000 to 150000 km (from the center of the earth).
A schematical drawing shows the trajectory of the rocket with

Card 1/3

Investigation of
Radiation and of

Terrestrial Corpuscular
Cosmic Rays During the Flight of a Cosmic Rocket

SOV/20-125-2-16/64

respect to the terrestrial magnetic field. The intensity maximum is ~26000 km from the center of the earth. At a distance of 55000 km the intensity of terrestrial corpuscular radiation becomes practically equal to zero, and the remaining ionization in this distance is entirely due to cosmic radiation. According to the authors' opinion the particles oscillate along the lines of force symmetrically to the equatorial plane. The increase of intensity along a given line of force in the transition from low to high altitudes serves as an experimental proof for this assumption. The particle flux is directed not only towards one side, and, in any case, the predominant part of the particles undergoes complete reflection when approaching the earth, and is therefore subjected to oscillations from one hemisphere to the other. The trajectory of the rocket nowhere intersects the so-called internal zone. . . Actually, the apparatus built into the cosmic rocket in no range of their trajectory record particles of high energy which are characteristic of the inner zone. On the other hand, the composition of radiation is very similar to that observed by means of the third Sputnik in polar regions. Next, the composition of radiation in the outer zone with

Card 2/3

Investigation of Terrestrial Corpuscular SOV/20-125-2-16/64
Radiation and of Cosmic Rays During the Flight of a Cosmic Rocket

high intensity is dealt with. In the center of the outer zone, where particle density is the greatest, the effective energy of electrons is minimal. In conclusion, cosmic radiation is dealt with. Beginning with a distance of 66000 km, the intensity of all components remains constant. The strict constants of all components at distances of from 66000 to 150000 km indicates the existence of a radiation upon which the terrestrial magnetic field exercises no influence. Therefore, either the terrestrial magnetic field vanishes at a distance of 10 earth-radii, or there are no particles with momenta of

$1.5 \cdot 10^8$ to $4 \cdot 10^7$ ev/o in interplanetary space. The energy-flux of the photons is very low and contributes partly nothing to ionization. There are 2 figures and 4 Soviet references.

SUBMITTED: February 25, 1959

Card 3/3

VERNOV, S.N.; CHUDAKOV, A. Ya.; VAKULOV, P.V.; LOGACHEV, Yu.I.; NIKOLAYEV, A.G.
Associate Member, Academy of Sciences, USSR.

"Radiation Measurements During the Flight of the Second Soviet
Space Rocket."

report presented at the First Intl Space Symposium, Nice, France, Jan 1960.
National Academy of Sciences of the USSR, Moscow.

VERNOV, S.N. and CHUDAKOV, A. Ye.

"Terrestrial Corpuscular Radiation and Cosmic Rays."

Report presented at the 1st Intl Space Symposium, Nice, France, January, 1960.

Academy of Sciences, Moscow, USSR.

2730
S/169/61/000/006/028/039
A005/A130

3.2420 (1049, 1482)

AUTHORS: Vernov, S.N., Chudakov, A.Ye.

TITLE: Radiation research in cosmic space

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 6, 1961, 10-11, abstract
6075. (Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959),
T. 3. Moscow, AN SSSR, 1960, 17-32)

TEXT: The authors present experimental data on investigation of cosmic radiation obtained by the second and third Soviet artificial satellites and the Soviet space rocket. Recordings were made by scintillation and Geiger-Müller counters with shields of different thicknesses. Incident to measurements at latitudes $> 60^{\circ}$ n.lat. a pronounced increase in intensity was detected which was caused by bremsstrahlung of electrons with $E \leq 100$ kev energy. Analysis of the altitude and latitude variation of the intensity of this radiation showed that it constitutes an outer radiation belt which is approximately limited by the magnetic lines of force intersecting the earth's surface at geomagnetic latitudes 65 and

Card 1/3

29366
S/169/61/000/006/028/039
A005/A130

Radiation research in cosmic space

55°. The mean electron energy at the outer edge (40,000 - 50,000 km from the earth's center) amounts to 50 kev, decreasing down to 25 kev towards the center of the inner radiation belt. Pronounced fluctuations of intensity in the outer belt at 400-500 km altitude were recorded. With the aid of the third satellite an inner belt of radiation was detected at about 50° latitude and below. In the western hemisphere at 15°s.lat. the lower boundary of the zone is detected even at low altitudes (~600 km) though no increase of ionization is detected at 15-20°n.lat. The southward displacement of the inner radiation belt is explained by an inclination of the axis of the geomagnetic dipole relative to the earth's axis of revolution. Furthermore, the center of the magnetic dipole is displaced toward the eastern hemisphere by about 500 km; therefore, the lower boundary of the inner radiation belt in the eastern hemisphere lies 1,000 km higher than in the western hemisphere. Analysis of the data shows that the inner radiation belt consists in the main of protons whose mean energy amounts to about 100 Mev. If these protons originate in neutron decay, their mean lifetime in the inner belt is of the order of 10^7 sec. Beyond the earth's magnetic field (more than 65,000 km from the earth's center)

Card 2/3

Radiation research in cosmic space

27366
S/169/61/000/006/028/039
A005/A130

the cosmic ray intensity remained constant and amounted to about $1,800 \pm 80$ particles $\cdot m^{-2} \cdot sec^{-1} \cdot steradian^{-1}$. The stream of photons with 45-450 kev energy amounted to $3,200 \pm 100$ quanta $\cdot m^{-2} \cdot sec^{-1} \cdot steradian^{-1}$, and with 0.45-4.5 Mev it was $1,000 \pm 100$ quanta $\cdot m^{-2} \cdot sec^{-1} \cdot steradian^{-1}$.

N. Kaminer

[Abstractor's note: Complete translation.]

Card 3/3

23936
S/035/61/000/006/018/044
A001/A101

3,2420
AUTHORS:

Vernov, S.N., Chudakov, A.Ye., Lebedinskiy, A.I., Ivanenko, I.P.

TITLE:

Composition of terrestrial corpuscular radiation and possible mechanisms of its origination

PERIODICAL:

Referativnyy zhurnal. Astronomiya i Geodeziya, no. 6, 1961, 33, abstract 6A287 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 3", Moscow, AN SSSR, 1960, 54-58)

TEXT:

Assuming that the outer radiation belt consists of electrons with energy spectrum $N(>E) \sim E^{-\gamma}$, the value of γ was determined to be ~ 5 for energies from 20 to 100 kev. Extrapolation of this spectrum to the region of lower energies (3 - 10 kev) would result in density of energy of particles which would exceed the density of energy of the constraining magnetic field. Therefore, either the spectrum of low-energy electrons must have a maximum or γ should be small. A weakening of the Earth's magnetic field was observed in the seat of a maximum filled trap. A fraction of auroras can be explained by leakage of particles from the outer belt into the atmosphere. The source of replenishment of the outer zone is solar corpuscular fluxes. At their motion, recombination is possible which gives

Card 1/2

23936

S/035/61/000/006/018/044

A001/A101

Composition of terrestrial corpuscular radiation ...

rise to neutral atoms. Atoms ionized about or within the radiation belt give rise to electrons captured by the magnetic field in the outer zone. The inner radiation belt is restricted by the force lines starting from the Earth's surface at latitudes 30° - 40° . It is filled up at β -decay of neutrons formed in the Earth's atmosphere by cosmic rays. At life time of protons in the belt being $\sim 10^7$ sec, the neutron mechanism is sufficient for filling up the inner zone up to intensity observed. A sharp fall off of intensity in the belt at the geomagnetic latitude 30° can be explained by three mechanisms: a) non-conservation of magnetic moment of particles, b) effect of magnetic disturbances, c) drift of low-energy particles from the Earth as a result of being affected by ring currents presumed to exist in the ionosphere.

V. Temnyy

[Abstracter's note: Complete translation]

Card 2/2

CHUDAKOV, A. Ye.

One should not exaggerate the dangers. Znan.sila 35 no.7:37-
38 J1 '60. (MIRA 13:7)
(Space flight)

66010

3.9000
3.2000

AUTHORS:

Vernov, S. N., Chudakov, A. Ye.

S/053/60/070/04/002/011
B006/B011

TITLE:

Investigations of Cosmic Rays and Terrestrial Corpuscular Radiation
in the Flights of Rockets and Sputniks

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol 70, Nr 4, pp 585-619 (USSR)

TEXT: The present article offers a survey of methods and results obtained from the investigation of corpuscular radiation in the space round the earth by means of space rockets and artificial satellites. Chapter 1: equipment (scintillation counter, gas counter, photomultiplier). Chapter 2: the outer zone of the terrestrial corpuscular radiation belt (position of this zone relative to the earth, investigation of intensity fluctuations according to the ionization effect). Chapter 3: the inner zone of the high intensity of terrestrial corpuscular radiation (position of the inner zone relative to the earth, nature and energy of the particles in the inner zone, constancy of intensity). Chapter 4: radiations outside the magnetic field of the earth (Table). Chapter 5: analysis of data obtained and possible hypotheses concerning the origin of terrestrial corpuscular radiation. Summarizingly, the following is stated: 1) The earth is surrounded by two spatially separate zones of high-intensive radiation. 2) The outer zone extends in the equatorial plane from about 20,000 to 60,000 km out from the earth center and is delimited by the lines of force of the geomagnetic field. In geomagnetic latitudes of 55 - 70°, this zone

Card 1/4

66010

Investigations of Cosmic Rays and Terrestrial
Corpuscular Radiation in the Flights of Rockets
and Sputniks

S/053/60/070/04/002/011
B006/B011

is observed at relatively low altitudes (300-1500 km). The intensity changes with time are considerable; in the flight of the first Russian cosmic rocket, the radiation maximum was recorded on January 1, 1959 at a distance of 26,000 km from the earth center on a line of force cutting the earth surface on the 63rd degree of latitude. In the flight of the second Russian cosmic rocket, this maximum was recorded at a distance of 17,000 km on the 59° line of force. 3) The particles occurring in this zone are electrons of two energy groups. The electrons of the first group have some ten kev. The maximum flux of electrons with energies greater than 20 kev amounts to $10^9 \text{ cm}^{-2} \text{ sec}^{-1} \text{ steradian}^{-1}$. Electrons of the second group have energies of the order of 10^6 ev and exhibit a maximum flux of $10^5 \text{ cm}^{-2} \text{ sec}^{-1} \text{ steradian}^{-1}$. 4) The inner zone begins on the equatorial plane at an altitude of 600 km on the Western hemisphere and extends up to distances equalling the terrestrial radius; it is delimited by a line of force on 35° latitude. The radiation intensity in this zone remains constant within about 15% in one month. 5) The particles occurring in this zone are protons of about 10^8 ev , their flux attains $10^2 \text{ cm}^{-2} \text{ sec}^{-1} \text{ steradian}^{-1}$. On the edge of the zone in the geomagnetic interval of 35-40° latitude, a low-energy radiation (electrons of less than 10^6 ev) is

Card 2/4

66010

Investigations of Cosmic Rays and Terrestrial
Corpuscular Radiation in the Flights of Rockets
and Sputniks

S/053/60/070/04/002/041
B006/B011

ascertained. 6) Between the two zones, in the interval of the geomagnetic latitudes of $40-55^\circ$, there is a region in which no higher radiation intensity is detected. Provided that measurements are accurate, it may be assumed that in this region, at an altitude of 300-700 km, the flux of electrons with more than 100 kev amounts to less than one-thousandth of the flux at the boundary of the outer zone. The same ratio compared with the one at the boundary of the inner zone holds for the flux of protons with more than 10^8 ev. 7) The particle radiation outside the magnetic field of the earth consists of protons and other nuclei (flux 2 particles/cm².sec). The photon flux in the interplanetary space is less than 0.1 photon/cm².sec ($h\nu > 450$ kev) and < 3 photons/cm².sec ($h\nu > 45$ kev), respectively. 8) It is concluded from a comparison of experimental data with theoretical considerations that, the high-energy protons are the result of a decay of neutrons emitted from the earth atmosphere. The radiation intensity in the center of the inner zone at low altitudes is determined by the ionization losses of the protons in the upper atmospheric layers. In geomagnetic latitudes of more than 30° and at larger altitudes of the equatorial plane intensity drops more rapidly due to the incompleteness of the magnetic trap. This incompleteness is independent of the particle energy, and it is therefore improbable for it to be related with the nonconservation of the

Card 3/4

4

66010

Investigations of Cosmic Rays and Terrestrial
Corpuscular Radiation in the Flight of Rockets
and Sputniks

S/053/60/070/04/002/011
B006/B011

magnetic moment of the particles. Ye. V. Gorchakov, S. Sh. Dolginov, G. I. Goly-
shev, V. G. Kort, A. I. Lebedinskiy, and I. P. Ivanenko are mentioned. There are
18 figures, 1 table, and 17 references, 14 of which are Soviet.

4

Card 4/4

CHUDAKOV, A.YE., NESTEROVA, N.M., DADYKIN, V.L., ZATSEPIN, G.T.,

"A Search for Photons with the Energy of 10^{13} ev. From Discrete Sources of Cosmic Radiation,"

report presented at the Intl. Conference on Cosmic Rays and Earth Storms, Kyoto, Japan, 4-15 Sept 1961.

34350

S/203/61/001/006/002/021
D055/D113

9,6150

3.2420 (1049, 1442)

AUTHORS: Vernov, S.N.; Chudakov, A.Ye.; Vakulov, P.V.; Gorchakov, Ye.V.;
Logachev, Yu.I.

TITLE: Radiation measurements in the outer radiation belt on
February 12, 1961, during the rocket flight towards Venus

PERIODICAL: Geomagnetizm i aeronomiya, vol 1, no 6, 1961, 872-874

TEXT: The article deals with data on the Earth's outer radiation belt collected when the Earth-Venus rocket launched, on February 12, 1961, was 30,000 - 45,000 km from the Earth's center. The special equipment installed in the hermetic container consisted of a scintillation counter and an **CTC-5** (STS-5) gas-discharge counter. The distribution of matter around the NaJ(Tl) crystal and the gas-discharge counter is shown in a table. By reducing the dimensions of the crystal and increasing the resolving power of the electronic system of the counter, the radiation intensity in the belt was correctly registered. Fig. 1 shows the overload characteristics for the counting channels of the scintillation (1) and gas-discharge (2) counters.

Card 1/04/

Radiation measurements ...

S/203/61/001/006/002/021
D055/D113

These channels could register up to 10^6 and 10^5 pulsations/sec. respectively. To penetrate the crystal of the scintillation counter and the working volume of the gas-discharge counter, electrons must have an energy of ≥ 3 Mev, protons - an energy of ≥ 32 Mev and the bremsstrahlung quanta - an energy of ≥ 30 kev. Curves on fig. 2 represent the counting speed of the scintillation counter (1), that of the gas-discharge counter after corrections were made according to the curves in fig. 1 (3) and the energy release in the crystal in relation to the distance from the Earth's center (2). As all three curves were more or less parallel, the mean energy release in the crystal for one reading of the scintillation counter was 130 kev and remained constant between 32,000 and 40,000 km and the mean energy of the bremsstrahlung quanta did not vary with distance. The constancy of the mean-energy release showed that no great changes occurred in the spectrum of electrons of the outer radiation belt. A diagram (fig. 3) shows the paths of the interplanetary rocket (curve 1) and those of another three Soviet rockets (curve 2). A comparison of radiation and ionization data concerning the interplanetary rocket and the space rockets no. 1 and 2, showed that the outer radiation belt was stable for a period of 2 years when no magnetic perturbances were recorded. However, this period was not long enough to

Card 2/14

Radiation measurements ...

S/203/61/001/006/002/021
D055/D113

evaluate solar effects on the outer belt, but could be taken as an indication of the absence of such an effect. The space rocket no 3 was launched during a moderate magnetic storm (the change in the vertical and horizontal components of the terrestrial magnetic field was about 250 and 150 γ respectively). The external side of the belt was not measured, but the total energy release in the crystal during the entire flight coincided with that calculated for the rocket no 1 and was 1.5 times less than that of the rocket no 2, i.e. no changes occurred in the mean state of the outer zone during the flight of the rocket no 3 during a moderate magnetic storm. Since measurements were started a few hours after the beginning of a magnetic storm, the radiation intensity in the belt had not yet decreased. On the other hand, it is also possible that not all magnetic storms cause the radiation intensity of the Earth's outer radiation belt to decrease. There are 4 figures, 1 table and 3 non-Soviet references. The three English-language references are: W.H. Hess, J. Geophys. Res., 1960, 65, no 10, 3107; P. Rothwell, C.E. McIlwain. J. Geophys. Res., 1960, 65, no. 3, 799; R.L. Arnoldy, R.A. Hoffman, J.R. Winckler, J. Geophys. Res., 1960, 65, no 5, 1361.

Card 3/0 11

Radiation measurements ...

S/203/61/001/006/002/021
DO55/D113

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Institut yadernoy
fiziki (Moscow State University, Institute of Nuclear Physics)

SUBMITTED: September 9, 1961

Card 4/0 4

27205

S/056/61/041/002/027/028
B125/B138

3,2410

AUTHORS: Zatsopin, G. T., Chudakov, A. Ye.

TITLE: Methods of seeking local sources of high-energy protons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 2, 1961, 655-656

TEXT: The method proposed by Cocconi for the localization of protons with $E \sim 10^{12}$ ev on the celestial sphere is based on the measurement of the relative delay times of the passage of a front of an atmospheric shower through scintillators. The authors believe that showers caused by 10^{12} -ev protons in the solid angle $\Omega \sim 10^{-3}$ sterad can be recorded more reliably and considerably more simply by using the Cherenkov radiation produced by a shower in the atmosphere. In doing so, the light flash is recorded by a photomultiplier placed in the focal point of a big parabolic mirror. In order to separate the showers according to the pulse coincidences, it is advisable to use several paraboloids in parallel arrangement. A primary photon of 10^{12} ev yields a flux of ~ 50 quanta/m². To record such showers the parabolic mirror should have an area of ~ 4 m². In the authors' view,
Card 1/3

#7205

S/056/61/041/002/027/028
B125/B138

Methods of seeking local sources ...

the method described here is better suited for the detection of photons coming from known radioastronomical objects than the Cocconi method. When the measuring apparatus is mounted on a mountain and larger mirrors are used, even primary photons of less than 10^{12} ev, can be recorded. Another advantage of the authors' method is the relatively large effective area of shower recording (of an order of 10^5 m²), which ensures high statistical accuracy. Using experimental data on cosmic rays in the atmosphere, the intensity of a photon flux with an energy greater than E at a distance R from the object is estimated to be

$I_{\Phi}(>E) \sim 10^{-5} E_{\min}^{-1} E^{-\gamma} c R^{-2} \bar{\epsilon}_{\cos} M$, where $E_{\min} (\sim 10^{-3}$ erg) is the minimum energy of cosmic-ray particles in the object; c is the speed of light; $\bar{\epsilon}_{\cos}$ and M are the density of cosmic-ray energy and the mass of gas in the object respectively. This formula is valid if the energy spectrum of cosmic rays in radio nebulae has the same shape as in the neighborhood of the earth. The expected portion of showers originating from photons within the solid angle $\Omega = 10^{-3}$ is given by

$\Delta = (I_{\Phi}/I_{\cos}) \cdot 10^3 = 5 \cdot 10^{10} \bar{\epsilon}_{\cos} M R^{-2} \sim 2 \cdot 10^9 H^2 M R^{-2}$. This formula is valid on

Card 2/3

27205

S/056/61/041/002/027/028
B125/B138

Methods of seeking local sources ...

the condition that $\bar{E}_{\cos} = H^2/8\pi$, where H indicates the magnetic-field strength. In the case of the crab nebula, the following relation results from $H = 3 \cdot 10^{-3}$ oe, $M = 10^{33}$ g, and $R = 10^{22}$ cm: $\Delta = 2 \cdot 10^{-7}$. For the center of the Galaxy, $\Delta = 5 \cdot 10^{-4}$ follows from $H = 10^{-3}$, $M = 10^{38}$, and $R = 2 \cdot 10^{22}$. It is seen that even the most favorable estimates yield only very small values of photon intensity. Since the spectrum of cosmic rays in several objects shows more high-energy particles than in the neighborhood of the earth, and since most astrophysical quantities are accurate only up to one order of magnitude, it would be useful to study the most promising objects (center of the Galaxy, radio nebulae) by the method discussed here. There are 3 Soviet references.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
(Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: June 6, 1960

Card 3/3

89610

S/020/60/136/002/013/034
B019/B056

9.9130 (104), 1046, 1060)

AUTHORS:

Vernov, S. N., Corresponding Member of the AS USSR,
Chudakov, A. Ye., Vakulov, P. V., Gorchakov, Ye. V.,
Logachev, Yu. I., and Nikolayev, A. G.

TITLE:

Radiation Measurements During the Flight of the Third Cosmic
Rocket

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 136, No. 2, pp. 322-324

TEXT: The third cosmic rocket launched on October 4, 1959 contained a scintillation counter and three gas discharge counters. All gas discharge counters had a wall strength of 50 mg/cm² steel sheets and were, in addition, surrounded by several shields. Counter I had a shield made from 3 mm lead + 1 mm aluminum with a counter window of 0.28 cm², which was closed by a 0.2 mm thick aluminum sheet. Counter II had the same shield, but without counter window, and counter III was in an aluminum container made from 2.5 mm thick aluminum. The scintillation counter recorded the ionization of the crystal (NaI) and the counting rate. Preliminary results of evaluation of the instrument readings are given from the time from

Card 1/2